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Isolation of a delta 6-desaturase gene from the cyanobacterium *Synechocystis* sp. strain PCC 6803 by gain-of-function expression in *Anabaena* sp. strain PCC 7120.**Reddy AS, Nuccio ML, Gross LM, Thomas TL.**

Department of Biology, Texas A&M University, College Station 77843.

The enzyme delta 6-desaturase is responsible for the conversion of linoleic acid (18:2) to gamma-linolenic acid (18:3 gamma). A cyanobacterial gene encoding delta 6-desaturase was cloned by expression of a *Synechocystis* genomic cosmid library in *Anabaena*, a cyanobacterium lacking delta 6-desaturase. Expression of the *Synechocystis* delta 6-desaturase gene in *Anabaena* resulted in the accumulation of gamma-linolenic acid (GLA) and octadecatetraenoic acid (18:4). The predicted 359 amino acid sequence of the *Synechocystis* delta 6-desaturase shares limited, but significant, sequence similarity with two other reported delta 6-desaturases. Analysis of three overlapping cosmids revealed a delta 12-desaturase gene linked to the delta 6-desaturase gene. Expression of *Synechocystis* delta 6- and delta 12-desaturases in *Synechococcus*, a cyanobacterium deficient in both desaturases, resulted in the production of linoleic acid and gamma-linolenic acid.

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